

SYNCHRO — SETTE

THE SUBSCRIPTION MAGAZINE FOR THE SINCLAIR ZX-81 / TS-1000
MICRO COMPUTERS

VOLUME 2..... NUMBER 5/6 JUNE/JULY 1983.... CASSETTE ISSUE ... \$10.00....



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There are 8 programs on this month's cassette, not counting the LOADER program which loads in 28 seconds.

The program names are as they appear on the above menu, which is similar to what will appear on the screen when the LOADER program is running.

Each program is recorded only once on each side of the cassette. The first programs that can be LOADED will be of the small size followed by the larger sized programs. For example, this month's cassette has the first to fourth programs recorded as 2K programs. The 5th to 8th programs are 16K. The other side of the cassette is a duplicate of the first side.

For you new subscribers who aren't familiar with LOADING procedures for cassette programs, follow these directions:

A - Make sure that the volume setting of the recorder is set at about 80 % maximum.

B - If you have a Bass and/or Treble control on the recorder, make sure the Treble is at maximum and the Bass is at minimum.

C - To LOAD the first program, type in LOAD "" and press the ENTER key on the computer. Then press the PLAY button of the recorder. The lead time on the APR/83 cassette is about 10 seconds until the first program begins.

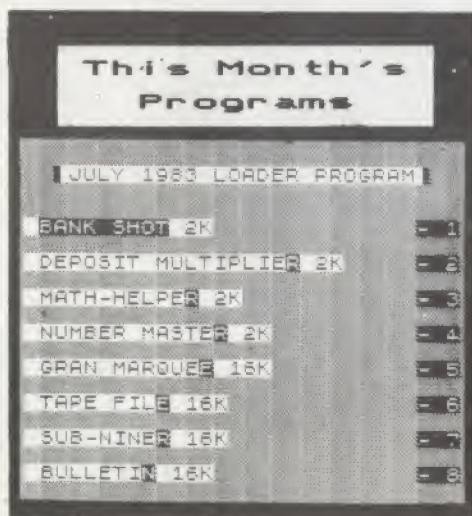
The time needed to load the LOADER program is 39 seconds. When the program is loaded, a list of this month's programs will appear automatically.

Shut off the recorder when the LOADER program is loaded. Any of the listed programs can now be loaded into the computer by pressing the appropriate number on the keyboard and then pressing the PLAY key on the recorder. The loader program loads the program by searching for the name of the program you want and ignoring any of the other programs it may encounter along the way.

If you want to go directly to a program without waiting, we suggest you first find the tape location of the beginning of each of the programs with your recorder counter. This can be done as you go through the programs the first time, noting the tape location on the counter as each one is being loaded.

If you don't have a counter, approximate the tape position with the fast forward key just before where the program would start, and then LOAD the program with the name of the program using the format LOAD "NAME OF PROGRAM".

Some of our subscribers have told us that they could not get the programs to load by name but they would load with the double quotes. Others have told us that



(1/2 VOLUME)

the loader program wouldn't load certain programs. Most have told us that all the programs could be loaded either way. Every customer's cassette is made from the same master tape, so the programs on everyone's cassettes are identical. We feel it is most probably a problem of volume adjustment or recorder design. We have noticed this situation on some of our recorders.

PROGRAMS (all programs this month are self running except "BANK SHOT".

- program's name has inverse last character if self running
- all characters are inverse in "BANK SHOT"
- RT = run time/LT = load time)

There is an approximate 7 to 20 second pause between programs

"BANK SHOT" LT = :24 24-35

This game program takes up every bit of memory space in a 2K machine. Therefore, I could not make it self-running.

RUN the program and rest 5 fingers on the keys numbered 1 to 5. A graphic billiard ball will appear from the top of the screen and will move on an angle to the left, hit the wall and bank to the right toward one of the 5 pockets. Press the corresponding key in time and 100 points will be added to your score. Press the wrong key or no key at all and the pocket number will disappear. When four pocket numbers disappear, the game will be over.

You may notice that if you have a 2K machine, after playing a few games, a memory full error may occur. CLEARing the computer will not remedy the situation. If you have a 16K machine, you may want to add routines that would recycle the game, INPUT player's name with high score displayed, and decrement the

score if a miss occurs. 37-42

"DEPOSIT MULTIPLIER" LT = :13

Perhaps you have an interest-bearing account that you wonder how long it would take for you to double or triple your investment in. If you use this program, it makes no difference if it is a savings account, money market, etc. The only stipulation is that the interest is compounded annually.

There are two INPUTs to the program:

WHAT IS THE INTEREST RATE PER YEAR?

and

WHAT IS THE INCREASE FACTOR?

If you are looking to double your money, enter 2 - if you are looking to increase it by 50%, enter .5. The program will find how many years it takes to reach the increase factor to the next even year.

This program can also be used to find appreciation of value if an estimated annual appreciation percentage is known, such as for real estate.

43-57
"MATH-HELPER" LT = :32

THE LAZY MAN'S CALCULATOR is probably a more appropriate name for this program. It is a 5 function calculator that allows the user to add, subtract, multiply, divide and find powers of numbers. What makes it so different is that only one finger is required to do the calculations. Floating point arithmetic is supported.

Enter any number up to 8 digits by just pressing the number keys one at a time. If a mistake is made, press the Z key

LOADER 9-23

and the last number will be erased. When the whole number is entered, press the logical operator key, either "+", "-", "*", "/" or "**", and then enter the second whole number. End the equation by pressing the "=" key and the answer will be displayed. For roots, use the power key "**" with a fractional entry. The entry for square root would be ".5", for cube root would be ".33333333", etc.

This program should be of good use to mathematics students.

----- 58-68
"NUMBER MASTER" LT = :24

This game is similar to MASTERMIND except it uses numbers instead of colors. The rules are as follows:

a. You have 9 rounds (the first one doesn't count) to guess a 4 digit number that the computer picks at random.

b. A digit in any one position of the 4 digit number is between 1 and 6.

c. You enter a four digit number for each round which is your guess what the number is.

d. A half-box graphic character will be displayed for every individual digit of your entry that appears in the actual number unless -

e. If an individual digit in your guess appears in the same column of the actual number, a full-box graphic character will appear.

f. When all 4 of these full-boxes appear, you have guessed the number correctly.

g. If you do not guess the number correctly, it will be displayed after 9 tries. Press the ENTER key to recycle.

I have been told that it is possible to guess any such number in no more than 6 tries, once you know the tricks. I know them but still can't get it in 6 tries every time.

----- 69-88
"GRAN MARQUEE" LT = :50

For you machine language buffs - this program is the King of all the scrolling programs we have presented so far.

Complaints on other programs have ranged from the characters being too small to see from a distance to the large letter generator routines working too slow.

Picture the practicability of a program to be used by a business to generate a moving marquee message that can be seen from anywhere in the store where the TV is in eye sight. Sales and product information could be displayed in an ever-repeating scroll.

Well, here it is - with some extra bells & whistles. The program will start with a prompt asking you to set the speed. "0" is slow and "9" is fast. Press any of the number keys and sit back. Neat, Muh?

In the immortal words of Albert Einstein, "You ain't seen nutting yet"!

You can still press any of the number keys to change the speed faster or slower. Try it!

But wait, there's more!

The characters that are being generated are 1/4 size of the screen. Do you want larger characters? Then press the "L" key.

Wow! How about that! The characters are now twice as big. But we've still got a way to go! Press the "S" key. The 1/4 size

characters return.

Set the speed at "9". Those characters really zip by, don't they? Now press the "F" key.

Jumping Jehosophat! This is the maximum speed that the characters can scroll at in this program. You will notice that none of the control keys work (don't press BREAK) that have been mentioned so far. Press the "C" key and the scroll will slow to the last speed entered.

How do you enter your own message, you ask? Simple! Press any key except BREAK or the control keys mentioned so far and the message entry prompt will appear. You can enter a pretty long message and unlike other large-letter scrolling programs, the effect is seen almost immediately.

There are other uses for the machine language routine in this program, which the old Professor says he will discuss in a future tutorial.

----- 89-146 -----
"TAPE FILE" LT = 2:56

We apologize that this program has a few bugs in it. Change the following lines to read:

```
8660 to read the same as line  
#2350  
8662 PRINT Z$  
8664 PRINT A$(N)  
8700 PRINT "WHAT IS THE NEW  
SUBJECT?"
```

and delete lines 8842 and 8844.
The program should now run OK.

For those of you who do not get involved with inventory programs and never saw a use for one, here is a program that everyone of us can use. This program allows you to keep a neat record of all the programs you have on tape so far.

It is set up to allow entry of only 10 programs, which I'm sure all of you will want to change to a higher number. Change line 10 to read:

```
10 DIM A$(n,32)
```

With "n" being the number of programs (or more for new additions) that you will enter, you should be able to set "n" to a maximum of around 250. The program bombs when it is set at 283 and slightly lesser amounts make the program bomb when data is entered. The larger "n" is, the longer the response time for data entry. For purposes of example, I set it at "10".

Get all your tapes in front of you and identify them with codes such as "001A" for one side and "001B" for the opposite side of the same tape. The next tape could be "002A" and so on.

Now, determine what is on each tape, if you haven't done so already. Find out the name of each program on the tape, its counter location if you have a counter.

If you don't, a good method of finding the approximate tape location is to advance a tape for about 20 seconds in the fast-forward mode and then stop the tape. Now put the recorder in rewind and time the rewind time. A stopwatch is helpful but it can be done with a sweep-second hand. Divide the advance time by the rewind time to get a ratio that we can call "p".

Now advance the tape to the beginning of the program in question and time how long it takes to rewind the tape. Multiply this time by "p" and that is about how long the recorder would have to be in fast-forward to reach the desired program. Call this time "AT" (for "advance time") and make a record of it to be used

later in the "TAPE FILE" program.

After you have all the pertinent information, you are ready to enter this data into the "TAPE FILE" program. Execute prompt #1.

The program will ask you for the name. When you have no more to enter, just press the ENTER key and the menu will return. There will be a pause whose length is determined by how large "n" is dimensionalized in line #10 before the menu returns. Figure about 3 1/2 seconds for every 10 programs.

You may have to shorten some of the data that is to be entered. Each prompt tells you how many characters maximum can be inputted.

The prompt asking for program subject can be answered with GAME, BUSNS, EDUC, GRAPH, MACH L, TUTOR, MATH, etc. If you don't have a recorder counter, put in "AT" as determined above or any other type of tape location.

For the TAPE/SIDE prompt, enter the codes you use or use the format we outlined earlier.

For the last prompt, enter any miscellaneous information you want. A good entry might be the number of the position that the program occurs on the tape - such as, is it the first program? - the second? - the fourth?

Prompt #2 from the main menu brings the user to a secondary menu. Prompt #2 from the secondary menu allows the editing of a program name. Prompt #4 allows editing of the other items. Prompt #1 scrolls all the data up the screen and prompt #3 allows one set of program data to be displayed

With any of the name search routines from the secondary menu, the user does not have to enter the complete name to perform the search, only enough characters that are unique to the name being searched.

Prompt #3 from the main menu allows the file to be stored on tape.

Prompt #4 clears all data so that a new file can be started.

Prompt #5 allows data to be printed.

Prompt #6 allows data to be sorted by any of the entered fields. A good method is to define the priority of the sort fields. An example would be to first sort by PROGRAM NAME and then sort again by SUBJECT. If the data was then printed out, the SUBJECTS would be in alphabetical order with the PROGRAM NAMES in alphabetical order by SUBJECT. Always perform the sorts in reverse order of priority.

----- 142-162
"SUB-NINER" LT = :46

Enter your name and the game will begin. Nine nines will appear in a box with a single number under it. Your score starts out as 100 but decreases each time you take a turn.

The idea of the game is to change all of the nine nines to zeroes. You do this by choosing the row you want the single number subtracted from. That row will have its number then decreased by the amount of the single number.

Your score will decrease by one, every time you enter a row - except if the single number is larger than the number in the row you wish to have it subtracted from. Then, your score will decrease by the amount of the single number and

The Chicago CONSUMER ELECTRONICS Show



Last year, the Chicago Consumer Electronics Show took up three floors of the main building of McCormick Place and entry was free to business people.

This year, the exhibits took up three buildings and entry was five dollars to business people.

Now that I gotten that out of the way, the good news. Once again, the exhibitors of video recorded tapes with adult themes, drew the largest crowds. There were some interesting new innovative non-computer products. One in particular was a TV that used a giant crystalline screen that produced a dramatic picture with an almost 3-D effect. A keyboard control could enter messages that would overlay the existing TV picture.

Another exhibitor had an arcade game where the user wore special glasses with motorized color wheels spinning over each eye. The visual effect produced was a color 3-D arcade game. It was still in the prototype stage. Another had panoramic arcade games.

A whole building was dedicated to home computers. Atari's exhibit was so large that it was not in that building. In my opinion, the two best and most exiting computer exhibits were from COLECO and TIMEX. First COLECO:

Watch for the ADAM computer.

Unfortunately, I didn't get any sales literature, but here are the specs as best as I can remember: 80K RAM color computer - built in word-processor - 2 internal data storage devices, not disk or cassette but high speed (comparable to floppy disk speed) and around a half-a-meg capacity called digital data packs - letter quality daisywheel printer - Smart BASIC (Applesoft source code compatible) - Super Game Pack all for the unbelievable price of under \$600.00. Look for the Coleco ADAM to replace the electronic typewriter in the business office.

TIMEX had a fantastic booth. A number of Muppet-type puppets appeared on a CRT and interacted with a running dialogue with the passersby. Needless to say, large crowds sporadically gathered. When questions were asked about TIMEX products, other CRTs would light up and commercial-type explanations were given.

About 10 each of the new TS-1500s and TS-2000s were available for hands-on demonstration. The appearance of all the new TIMEX equipment is a silver-grey metallic in color, including the 2040 printer (the versions sold now are black).

The 1500 uses the European Spectrum case, but it is silver instead of black. The keys are a soft rubber that is touch-sensitive and very pleasant to work with. These are

real keys and not the membrane type of the 1000. The response time is the same, however. There is 16K of RAM internal and the 16K rampacks can be plugged in the back for a total of 32K - no POKEing required to get the full 32K.

Otherwise, the computer is identical to the 1000 in every way but one. We had a 1500 on loan at our shop and tried to load some 1000 programs into it. No dice! We fooled around with the volume adjustment and just couldn't get the program to load. It loaded with no problem on a 1000.

We then took a master tape which has extremely pure sound pulses and tried loading that and after fooling around with the volume adjustment, achieved success. A little bit higher or lower with the volume and the program wouldn't load. Crashes would occur almost immediately. We used the old LOAD "XXX" trick to examine the wave pattern on the screen and noticed it didn't look like anything we had ever seen before. Also, when the program was loaded, anytime a routine went from SLOW to FAST and BACK to SLOW, the screen lost its horizontal hold and would have to be adjusted. It may have been the TV but this effect never happened with the 1000 before or after.

I contacted one source to ask about this and was told that the 1500 LOADs and SAVEs at 400 baud as opposed to the 300 baud of the 1000. That means that the program pulses are being sent 33 % faster on the 1500. I didn't get a chance to save a program with the 1500 to try to load it back on the 1000 to see if there are any problems. The reason for the baud increase, as explained to me, is that reliability is increased for LOADs and SAVEs.

I then contacted another source that has had some

hands-on experience with the testing of the 1500 and was told something completely different. He said that he had never experienced any problems of loading or saving any programs that were made on one machine and put into the other. He said if anything, the programs loaded into the 1500 with less problems and he has used quite a few 1500s. He said the problems I encountered probably were due to a defective 1500 or one of the earlier prototypes. The one we were using was one of the earlier prototypes. Who knows!

When the 1500 is introduced, which could be any day now (but shouldn't be any later than late August), a cartridge interface should also be available. This device will also work on the 1000 and ZX-81 and allow cartridge software (TIMEX is coming out with a line but we don't know the subjects or how many) to be used where the programs fire-up immediately. No word could be given when the telephone modem will be available.

Projected price is to be 99.95 - however, our sources say it will probably be closer to 79.95, either immediately or within a few months after introduction.

The 2000 is a different story. My original belief that this will be the PEOPLE'S COMPUTER was not swayed. What a beautiful machine. I witnessed some fast moving color graphics adventure games with sound that would rival any of the competition's products at a fraction of the cost.

It comes in two versions. The 2048 will have 24K of ROM and 16K of user RAM. It will have an on-board cartridge interface in the form of a door on the lower right-hand corner of the keyboard. 42 keys, automatic repeat, one-touch keyword entry,

reset key, 16 keyboard graphics symbols, 21 user-defineable keyboard graphics, two separate program selectable 32 by 24 character line displays with a regular color TV set. This means that the screen can be split either vertically or horizontally with each section having 24 lines with 32 characters per line. Pixel resolution is 256 X 192.

A 64 by 24 character line display can be achieved when the 2000 is used with a monitor, and pixel resolution is increased to 512 by 192. This high resolution/split screen feature is not available with the SPECTRUM - nor is the cartridge interface.

We learned (not from Timex) that that the color monitor they are negotiating for will have a 13 inch screen and sell for around \$200.00 to the consumer.

There are 8 colors and 4 sound channels, each programmable to 8 octaves. It comes with peripheral ports to accomodate a cassette recorder, 2 joysticks, the cartridge software and an expansion connector which will interface the mini-drives that are supposed to be available sometime next year.

The second version is called the TS/2068 and is the same as the first but has 48K of internal RAM. If you add this to the 24K of ROM, you will notice that the computer has 72K of addressability which is beyond the 64K addressability of the Z-80 processor. TIMEX has jumped on the multi-plexing bandwagon.

We did a benchmark test of the speed of the 2000 compared to the 1000 and found it to operate 6.3 times as fast as the 1000 in the SLOW mode. This is the same speed that the 1000 operates at while in the FAST mode. There is no FAST or SLOW

modes with the 2000. It acts as if it is in the FAST mode without losing the screen display.

The cartridges come with up to 56K and displace 8K of the existing ROM. It should be interesting to see what a bulked-out 56K program can do on that machine, particularly if it leaves little user RAM like a Chess game. Ought to be pretty powerful.

I have compared the 2000 to the Sinclair SPECTRUM and the 2000, in my opinion, is the better machine with more features. Projected prices for the 2048 and 2068 are to be 149.95 and 199.95. Our sources put them at 99.95 and 149.95 within a few months after introduction.

The SPECTRUM is now being sold in Australia and rumor has it that that version is different than the European version and might work with our TV sets.

Back to the PEOPLE'S COMPUTER concept. It is our understanding that the variable arrays, whether string or numeric, will be much more memory efficient and will allow many more arrays to be created. These variables and variable arrays will be able to be stored on tape or the micro-drive media, separate from the program itself. This is not the case with the ZX-81, TS-1000 or TS-1500 computers. For this reason, along with the price marketing, it puts the 2000 in a class all by itself. There is simply nothing that can touch it.

Competition had you believe that a person would buy a 1000, educate him(her)self to a point of computer literacy, realize the limitations of the 1000 and then move up to their product. This may have been true with the ZX-81, TS-1000 and the TS-1500

but it is definitely not going to be true with the 2000 series.

You have no idea how many small business people are running their businesses with the ZX/TS machines as they are available today. I talk to at least a couple a week. But be that as it may, the limitations don't exist in the 2000 where a person will have to move up to a larger micro for the most part.

APPLE and RADIO SHACK are successful in schools because of the educational software support which doesn't yet exist for TIMEX. The same is true in the business world. I give it one year approximately after the 2000 is introduced before parity is reached and two years before those companies are surpassed if they stick to their present marketing concepts. Look what is happening to TI!

Wait till you see the programs we will have available for the 2000.

I recently talked to a person who was responsible for purchasing 20 APPLE 2Es for a high school computer class. I asked him "Why APPLE" when TI, Commodore, Radio Shack, Atari and Timex all offer less expensive equipment? His answer boiled down to three words - Educational Software Support.

Start writing those educational and business programs as soon as you can get a 2000! I firmly believe the market will be there for years to come!

In the hush-hush area of the TIMEX new product future, plans for a high speed - mass storage device for the 1500 is being looked into. Either a 3 inch floppy or a stringy floppy is being investigated through outside manufacturers.

The only thing that is lacking in the TIMEX product line is a good 80 column ink-cartridge printer that prints on standard tractor-fed 9 1/2 by 11 inch computer paper. A combination friction/tractor printer in the \$400 price range would find a very available market. I feel this is a minor problem because I'm sure that aftermarket companies, such as Memotech, will offer such printers or at least a printer interface that would allow Centronics compatible printers that could be purchased at local computer stores to be connected.

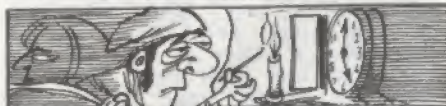
As a matter of fact, it is possible that the existing TS-1000 printer interfaces may work on the 2000. I say this because the 2040 will work on both machines.

Speaking of printers, I saw at the CES show an 80 column thermal printer hooked up to a TS-1000 and it worked just like the 2040. The vendor preferred to remain anonymous.

All in all, we didn't get a chance to see everything we wanted. We learned after the show that there was one vendor who had a device that could make duplicates of cartridge software on blank cartridges. If anyone is aware of any more information on this subject, please let us know.



The first pinball game machine was the "Whoopee Game," manufactured in 1930 in Chicago, Ill.



An early alarm clock, invented in the 1800's, involved a candle that would come out of a box when it was time to wake up.

the Computer Tutor

FLOATING SCREEN MEMORY MAP



Good afternoon, class! My, there seems to be a smaller attendance today. Must have something to do with the warm weather. Please try to stay awake if you can. Will someone nudge that fellow in the back row? Thank you!

Thank you for your positive response to last month's tutorial on machine language regarding the reverse scrolling of the screen. This month's tutorial is not exactly about machine language but it does involve machine code to perform a very important operation.

Today's lesson will be on mapping the TV screen. If you are not familiar with what this will accomplish, let me explain what it's all about:

On most other computers, what appears on the CRT is a result of what is located in a certain area of the computer's RAM memory locations. These locations are outlined in the computer's reference manual and never change. The user can PEEK any of these locations and identify the character's code as it appears on the screen. The user can also POKE a character code number into one of these locations and that character will appear on the screen.

The TS/ZX computers allow 704

screen locations. Let us say that our computers had been designed where the first screen location resided in the RAM decimal address of 20000. If we were to enter the command:

```
POKE 20000,128
```

a square graphic block would appear in the upper left hand corner of the screen.

If the graphic block (consult manual for section on Sinclair character codes) already existed in that location, we could confirm its existence with the command phrase:

```
PRINT PEEK 20000
```

and "128" would be displayed. Unfortunately, the ZX/TSs do not allow a "dedicated" area of RAM to be allocated to what appears on the screen.

In the May of 1982 tutorial, a method was presented where a "Dummy Screen Memory Map" could be simulated. This was done by simply transferring the codes to a dedicated area of memory, just before they appeared on the screen - a sort of mirror effect. This way, they could be cross-referenced for future use.

We have been taught that the TS/ZX machines, in effect, throw

accidental POKES into this forbidden area. With the original program in the computer, punch in various screen locations and observe the control you have. You will notice that if any of the available locations in the bottom two lines are entered, the block briefly flickers on the screen, disappears and then the "L" cursor reappears. When INPUT is used in a program, any characters that appear in the bottom two lines will disappear. As long as an INPUT is not used, the bottom two lines can be utilized.

It is easy to see that this simple 5 line program can be used to paint pictures and if the following 2 lines are added, the second prompt in the program will allow the user to determine not only the location but the type of character to be displayed by inputting the code for that character:

```
25 INPUT Z
40 POKE X+Y,Z
```

But the locations 16404 and 16405 are not the only locations that identify where the screen may be. Actually, if certain commands are used in the program, difficulties can arise. ENTER the following line to the original program:

```
35 SCROLL
```

Now try entering the co-ordinates of the first column starting with "1" and then "34" and so on. Eventually we reach a number where we notice that nothing additional appears on the screen (or for any numbers higher than that) even though we haven't exhausted our supply of screen positions. SCROLL seems to screw up the memory map.

Another set of memory positions that seems to work even better is 16396 and 16397. Enter the following program:

```
10 LET X=PEEK 16396+256*PEEK 1
6397
20 PRINT "WHAT IS THE SCREEN
POSITION?"
30 INPUT A
40 IF A/33=INT (A/33) THEN GOT
0 30
50 PRINT "HOW MANY LINES DO
YOU WANT SCROLLED?"
60 INPUT B
70 IF B>INT (A/33) THEN GOTO 6
0
80 CLS
90 POKE X+A,128
100 FOR N=1 TO B
110 SCROLL
120 NEXT N
130 LET Y=X
140 IF PEEK Y=128 THEN GOTO 100
0
150 LET Y=Y+1
160 GOTO 140
1000 PRINT AT 10,0;"X = ";X;"Y =
";Y
1010 PRINT "X," + "A," - "Y,"
=";X+A-Y
1020 PRINT "THE X POSITION AFT
ER THE SCROLL IS ";PEEK 16396+25
6*PEEK 16397
1030 PRINT "CHECKSUM OF AMOUNT
OF SCROLLED LINES IS ";(X+A-Y)
/33
1040 PRINT "AMOUNT OF LINES TO
BE SCROLLED THAT YOU ENTERED W
ERE ";B
```

Enter the screen position for the first prompt and how many lines you want scrolled for the second prompt. Make sure that the amount of scroll lines do not exceed the amount of lines available and that the screen position is not in the bottom two lines. After a few seconds, information will appear on the screen that will verify the new co-ordinates.

If you were to use screen position #710, which is in the middle of the 22nd line and asked the program to scroll the inserted graphic block up 15 lines, you will first see the graphic block appear and then move up 15 lines. A short time later, the scanning routine, located in lines 140 to 160, will locate the block in its new screen position and the following will appear on the screen:

X = 17140 Y = 17355

17140 + 710 - 17355 = 495

THE X POSITION AFTER THE SCROLL
IS 17140

CHECKSUM OF AMOUNT OF SCROLLED
LINES IS 15

AMOUNT OF LINES TO BE SCROLLED
THAT YOU ENTERED WERE 15

In line #1, X, which is 17140, represents the space just before the first screen position. Y, which is 17355, represents the screen location where the graphic block was found after it was scrolled.

In line #2, the screen position you entered (710) is added to the X value and the memory location (Y which is 17355) where the graphic block was located, after the scroll was performed, is subtracted from that amount to give the remainder of 495. This remainder represents the amount of spaces the graphic block has moved backward in RAM memory and on the screen.

The 3rd line rePEEKs the locations of 16396 and 16397 to see the value. As you can see, the new X is the same as the old X. This isn't always true when 16404 and 16405 are used. This tells us that 16396/16397 are unaffected by the scrolling process to determine the screen map.

The fourth line divides the remainder number (495) by 33 to provide a checksum number of lines scrolled. This checksum number should be equal to the number you entered which is verified in the fifth line.

Try using this routine to POKE a graphic character in the 23rd or 24th line. What has happened? The gentleman in the

rear has his hand up!

It doesn't work, he says. Well, I believe that's obvious. But why not? No hands this time, I see.

Well, the reason it doesn't work is because the SCROLL command will start the scroll with the 22nd line. Even though the routine determines a Y position to be somewhere on the screen, it is obvious to see that the graphic block never moved from its original position (other than to oscillate up and down).

So, we can still see that the SCROLL command can create some problems. These routines can be used to create games and other graphic display situations. There is one other extremely useful application and that is for copying the screen to the printer.

Even with my back to the class while I'm writing on the blackboard, I can sense the gentleman in the rear has his hand up. Yes Sir?

He says, "Why not just use the COPY command?"

The answer is simple! The copy command will only copy the first 22 lines of the screen and ignore the bottom two lines. ENTER the following program:

```
10 REM FULL SCREEN CHARACTER  
20 FAST  
30 DIM A$(24,32)  
40 FOR N=1 TO 24  
50 LET A$(N)=STR$ N  
60 LET A$(N,32)=""  
70 FOR I=3 TO 31  
80 LET A$(N,I)="-"  
90 NEXT I  
100 NEXT N  
110 POKE 16410,0  
120 FOR N=1 TO 24  
130 PRINT A$(N)  
140 NEXT N  
150 DIM B$(32)  
160 PAUSE 40000  
170 GOSUB 1000
```


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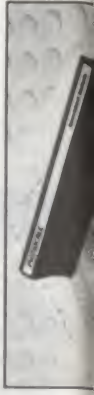
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Printer Cable	19.95		
GP 100A Printer Package**	399.00		
Shipping and Handling	4.95		\$ 4.95
Tax (Colorado residents only)			
TOTAL			\$

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MEMOTECH

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```

200 REM STEP 1: PRINTING ROUTINE
210 FOR N=1 TO 760 STEP 33
220 FOR I=1 TO 32
230 LET B$(I)=CHR$(PEEK (X+N+I-
1)
240 NEXT I
250 LPRINT B$
260 NEXT N
270 STOP
1000 REM MEMOR MAP LOCATING
ROUTINE
1010 LET X=PEEK 16396+256*PEEK 1
6397
1020 RETURN

```

The routine from 10 to 170 will generate a co-ordinate pattern that will fill all 24 lines of the screen. The 1000 sub-routine identifies the screen map and the 200 to 270 routine does the actual printing of the screen, INCLUDING THE BOTTOM TWO LINES.

```

1 .....
2 .....
3 .....
4 .....
5 .....
6 .....
7 .....
8 .....
9 .....
10 .....
11 .....
12 .....
13 .....
14 .....
15 .....
16 .....
17 .....
18 .....
19 .....
20 .....
21 .....
22 .....
23 .....
24 .....

```

If the 200 and 1000 routines were written into just about any program, any screen frame could be printed from that program by first executing the 1000 sub-routine and then the 200 routine.

Well, there's the bell. For extra credit in this class, you might want to try this program that creates a visual display with random graphics characters being POKEd onto the screen:

```

20 LET X=PEEK 16404+256*PEEK 1
6405-794
30 FOR N=1 TO 791
40 IF N/33=INT (N/33) THEN LET
N=N+1
50 POKE X+N,126
60 NEXT N
65 SLOW
70 POKE X+1,7
80 POKE X+32,132
90 POKE X+760,130
100 POKE X+791,129
110 FOR N=34 TO 727 STEP 33
120 POKE X+N,5
130 NEXT N
140 FOR N=65 TO 758 STEP 33
150 POKE X+N,133
160 NEXT N
170 FOR N=2 TO 31
180 POKE X+N,3
190 NEXT N
200 FOR N=761 TO 790
210 POKE X+N,131
220 NEXT N
230 SLOW
240 POKE X+174,RND*63+128
250 POKE X+191,RND*63+128
260 POKE X+603,RND*63+128
270 POKE X+620,RND*63+128
280 GOTO 240

```

I realize this is vacation time for many of you so there will be no homework. CLASS DISMISSED!

Somebody wake up that guy in the back, please?



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For many of us, the BASIC language is an excellent high level language that allows the user to be introduced to the world of computers. We all now have some ability in at least elementary program creation.

If not, we can become quite comfortable in just using programs that have been written by someone else. We find we can balance our checkbooks, plan our diets, educate ourselves and our children in school and non-school subjects, analyze our reflex limitations, question our knowledge in various areas and, of course, play those ever available games, all with the aid of a computer.

Up to now, for most of us, the BASIC language is the only one we could identify with, mainly because of the owner's manual and because most programs are available in BASIC.

We have seen machine language programs and routines and have been impressed with the speed and capabilities of machine code. We may have noticed that some effects occur that we cannot duplicate with the BASIC language, even at its slower speed. We have looked at the so-called "machine language made easy" tutorials and many of us have walked away shaking our

heads.

Enter "FORTH"!

WHAT IS FORTH?

FORTH is a high level language that allows us to write programs with an entry format that has similarities to BASIC but gives us much stronger computing capabilities and with a speed comparable to machine language.

As a matter of fact, FORTH allows the user to create command words and statements that link together existing FORTH commands. The user can then compile these commands into routines that operate much faster than BASIC.

I was intrigued with the idea of doing a review of PLURI-FORTH from TREE SYSTEMS. This is an interpreter program, resident in a ROM chip of a circuit board. The old BASIC ROM is removed from the ZX/TS machine and the PLURI-FORTH board is plugged in its place. The BASIC chip can then be soldered into the PLURI-FORTH board and a toggle switch added - but more on this later.

The reason I preferred the chip/board over a software program on cassette is twofold:

1. The FORTH language is resident in ROM and comes up running immediately and,

2. Since it replaces the BASIC ROM it is more memory-efficient, and with a 16K RAMpack the user has over 15K to work with.

The minimum configuration needed is 2K RAM. It won't work on a 1K ZX-81 but it will work on a 2K TS-1000. It will work on either machine with a 16K RAMpack. It uses about 1/2 K of the 2K or 16K RAM along with the 8K ROM.

On the ZX/TS computers, we have the FAST and SLOW modes. These also exist with PLURI-FORTH. But FORTH also has another mode called AUTO. This mode will make a program operate in the SLOW mode automatically until it reaches a situation where it is going to do some calculating that requires more than 1/4 of a second. It will then send the program automatically into the FAST mode until the calculating is done and then return to the SLOW mode.

I did some benchmark timing tests on the ZX/TS machines in the SLOW mode with the following program:

```
10 FOR N = 1 TO 10000
20 NEXT N
```

It took 43 seconds for this program to RUN. PLURI-FORTH has a similar routine called a DO-LOOP. A DO-LOOP can count from 1 to 20,000 in one second.

Sounds impressive, doesn't it!

FORTH is not as easy to learn as BASIC (what's that you say - BASIC isn't that easy to learn either?). FORTH programs do not enter like BASIC.

PLURI-FORTH uses ASCII characters rather than the

SINCLAIR code. ASCII (American Standard Code for Information Interchange) is an industry standard and is compatible with almost every other computer and interface device.

There are two screens with PLURI-FORTH. The first appears when the computer is first fired up. If the user presses the SHIFT/EDIT keys, the second screen appears which is made up of two sections separated by a bar, which is called a PAD. The portion above the PAD contains 16 potential lines and is called:

THE SCREEN EDITOR

This part of the screen is used for entering programs

THE EXECUTION SCREEN

This part of the screen is used to compile the program into machine language and to execute it. There is a EOF command that allows the upper portion to be scrolled away so that the entire screen can be used to observe the program when it is running.

The program can be compiled line by line or in its entirety.

FORTH is, however, much easier to learn than machine language. To give you an idea on what kind of people can learn FORTH, there is a group of people who are trying to introduce FORTH into elementary school level teaching situations as the best language to be taught in schools. Why?

Forth combines the power of many other languages that are much harder to learn or more specialized.

Maybe you have been thinking of selling or shelving your TS/ZX computer and purchasing a more sophisticated machine. Here's a suggestion. The PLURI-FORTH language comes on a

chip/circuit board. I had a computer with a keyboard enclosure that I opened up and removed the existing BASIC ROM chip from. The directions state that the resistors next to the ROM socket had to be bent down in order to plug in the circuit board. This is true if you use the board in the ZX-81 or TS-1000 factory case. If you have a larger keyboard enclosure that houses your circuit board, you can purchase from Radio Shack a socket extender (bring the old BASIC ROM chip to R.S. to get the right one). Plug the extender into the CPU board, solder it, and plug the PLURI-FORTH board into the extender socket.

If you want, you can purchase another extender and solder it into the PLURI-FORTH board and plug the BASIC chip into that. A single wire on the PLURI-FORTH board can now be cut and a 2-wire toggle switch attached. This enables the user to switch between the BASIC and PLURI-FORTH languages. Of course, any data in memory will be lost if this is done. However, the user, in effect has the capability of two computers.

I doubt if anyone can purchase a computer with FORTH resident in ROM for the price of this conversion.

Now, let us take a simple program in BASIC and see how it would be entered in FORTH.

BASIC PROGRAM - NUMBER DOUBLER

```
10 CLS
20 LET I = 1
30 IF I>32767 THEN STOP
40 PRINT I;" ";
50 LET I = 2*I
60 GOTO 30
```

If this program was RUN on the TS/ZX computer, the screen would display the following:

```
1 2 4 8 16 32 64 128 256 512
1024 2048 4096 8192 16384
```

To write the same program in FORTH, the user would enter the following into the editor (upper) portion of the screen:

```
: DOUBLER CLS 32767 1 DO I . I
+LOOP ;
```

The user would then press the SHIFT/EDIT key to enter into the execute (lower) portion of the screen and enter "CPL". FORTH would now "compile" the program into machine language.

The user would now enter "DOUBLER" and the program would RUN with the same display as the BASIC version but much faster. Let us examine how the FORTH version of the program works.

You will notice that there is only one line and no line numbers. The ":" at the beginning and the ";" at the end of the line designate the contents and the program name. The name "DOUBLER" appears right after the colon and is recognized as the program's name. The "CLS" operates just like BASIC and clears the screen. The "32767" functions as the same limit-operator as in the BASIC version. The "1" is the value of the numeric variable "I" and the ".", the "DO" and the "+LOOP" act as either a FOR/NEXT loop or the cycling loop as found in lines 30 and 60.

But here is something you can't do in BASIC. If the user was to enter the line in the editor mode:

```
: DUBL2 DOUBLER ." ALL DONE " ;
```

The following would be displayed on the screen:

```
1 2 4 8 16 32 64 128 256 512
1024 2048 4096 8192 16384 ALL
DONE
```


"DUBL2" contains the
"DOUBLER" program and the
message "ALL DONE".

Now, while in the execution
mode, we find we can execute two
different programs, "DOUBLER"
and "DUBL2".

Herein lies the power of
FORTH. From this simple example,
we can observe a number of
things:

.... more than one program or
routine can be in the computer
at the same time.

.... programs, routines or
commands can be merged together.

.... a small amount of
keystrokes can accomplish in
FORTH a desired effect as
compared to BASIC.

.... the memory used by the
program in FORTH is much smaller
than that used by a similar
program in BASIC.

.... the speed of execution in
FORTH is much faster than BASIC
because it is in machine
language when executed.

.... FORTH gives the advantages
of machine code regarding speed
and extra command capabilities
while giving the advantages of a
structured language (such as
BASIC) regarding keyboard
program entry.

The PLURI-FORTH chip/circuit
board is manufactured by TREE
SYSTEMS and marketed by:

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If we wrote our cassette
programs in FORTH, all of the
programs could be put in the
same program if memory would
allow it. The user need only
load the one program and could
go back and forth between them.
How's that for power?

Next month, we will examine
more of the FORTH commands and
show some more programs and
compare them with their BASIC
counterparts.

=====

(Programs cont.)

the program will treat the
row-number as if it had 10 added
to it.

This game combines skill and
luck so that if you learn the
tricks, you can consistently get
scores above 60 (my best score
was 70).

High player/Score will be
displayed.

"BULLETIN" LT = 3:37 RT =
15:24

Our bi-monthly bulletin board
program. This month's version
really bulks out the 16K memory
as evidenced by the message
running time of 15 minutes and
24 seconds and the time taken to
generate the screen graphics
before the messages start and a
lot of that is done with machine
language.

To stop the scroll, press any
key but BREAK. To restart, do
the same thing.

(continued on page 31)

Editor Ramblings



SIR CLIVE - TODAY A KNIGHT

No longer can we call him Uncle! Clive Sinclair, recognized for his many accomplishments in his homeland, has had bestowed upon himself the Royal Order of Knighthood by the Queen of England.

Sir Clive, at the age of 42, is one of Britain's best known and wealthiest entrepreneurs. His accomplishments include breakthroughs in the fields of digital watches, calculators and microcomputers which have consistently sold for less than even the Japanese.

The pocket TV set we have mentioned before with the two inch screen is due to be sold in the British market before the year is out.

The electric car is an important item on Sir Clive's agenda and he has apparently taken a serious step toward entering that market. He has purchased an option to acquire a major portion of the defunct De Lorean Motor Company's automobile assembly plant in West Belfast, Northern Ireland.

Sinclair has been working on the electric car concept for a decade and according to a company spokesman, a prototype may be ready in less than two years. A new type of lead-acid battery that will be light, low-cost and quickly recharged is under development.

Sir Clive has also shown an interest in the Lotus sports car company and is considering making a personal investment in that concern.

FIREFOX IN ANTIGONE

A U.S. Air Force pilot flying alone on a reconnaissance mission spots what appears to be a group of missile silos being built on the border of an enemy and neutral country.

The plane swoops lower to take photographs when out of nowhere, an enemy Russian-built MIG appears dead in the rear of the U.S. aircraft. The pilot wills the plane into a defensive maneuver and pictures in his mind a missile being launched from the rear of his aircraft and destroying the MIG.

Within a split second, the projectile is fired and the enemy aircraft goes down in flames!

A scene from a movie or a science fiction novel?

Not quite! Scientists at the University of Utah believe they have found a way to accomplish this with today's technology.

These bio-engineers have found that thought patterns can stimulate electrical activity in certain body muscles. These electrical impulses could be monitored to control computers

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These bio-engineers have found that thought patterns can stimulate electrical activity in certain body muscles. These electrical impulses could be monitored to control computers that would perform aircraft maneuvers and manipulations much faster than by doing them manually, according to Professor John Wood.

Wood and Dr. Stephan Jacobsen have developed a mechanical arm costing \$20,000 utilizing these techniques. The Air Force has provided a grant to fund future research which will cost between \$30,000 to \$50,000.

The university is the same one that developed and implanted the artificial heart in Seattle dentist Barney Clark.

149.95, 99.95, 49.95, 39.95, ?

What is the cheapest price a computer can be purchased for? The above prices reflect the suggested retail prices for the ZX-81 or TS-1000 computers since conception to present date.

Sears and K Mart have dropped the selling price even lower to 29.97. K Mart was selling the 16K RAMPack for 34.97 and is now selling it for 39.97. These RAMPacks, by the way, can be attached to the new TS-1500 for a total of 32K of memory.

In other facets of the computer price-discount war, K Mart is selling the Commodore 64 for 199.95. This computer sold for \$599.95 when new and was, in my opinion, an excellent buy at that price at that time.

The TI-99/4A, which originally sold for 1150.00 when introduced, can now be purchased almost anywhere for under \$100 after rebate.

Computers from Radio Shack, Atari and other companies have been discounted tremendously. The Apple 2, which a year or so ago sold for around \$1400, was phased out and sold for under \$600.00.

This type of price-axing never existed until the TS/ZX computers showed up on the scene. The profit margins for the manufacturers must have suffered substantially in the process.

But this is only the beginning. Radio Shack has a low-end color computer in the works that is to sell for around \$125.00. It comes with 4K of RAM. Compare that with the features and cost of the 2000, the cost of the add-on peripherals and the massive

marketing campaign of Timex and that computer will probably be lost in the shuffle.

A lot of manufacturers have re-structured their thinking and will have to continue to do so.

SYNCHRO-SETTE DOUBLE ISSUE?

If you look at the cover of this month's issue, you will see that it says JUNE/JULY 1983. This might be interpreted as being a loss of one magazine or cassette tape to our subscribers.

Let me assure you that this will not be the case.

All subscriptions will be extended one month so that everyone will receive exactly 12 magazines and 6 cassette tapes for their investment. The same goes for any advertising contracts in effect. The ads will appear in as many issues as contracted for.

The reason for this move is two-fold:

1. Ever since the conception of Synchro-Sette, the magazine has been shipped at the end of the month with that month's name appearing on the issue. To many subscribers, this was envisioned as being a product that came out late with old news. This was and is not the case. Many of the news items were inserted into the copy at press time making the magazine as up to date as possible.

2. The cassette tapes coming out on even-numbered months posed some book keeping problems we didn't anticipate when the magazine was first conceived. A system with the cassettes coming out with the first month of the year is an easier and more logical structure to work with.

The cassettes will now come out on odd-numbered months with a new subscriber who begins on an even-numbered month, having the subscription pre-dated one month so as to include the last available cassette and issue.

The next magazine you will receive will be the August 1983 issue with the following month being September and so on.

The cassettes will be shipped with the odd-numbered month's issues.

We hope this doesn't create too much confusion. The product should be shipped with the same regularity as in the past.

2K OR NOT 2K, THAT IS THE QUESTION!

What do you think of the idea of phasing out the 2K programs on the bi-monthly cassettes?

Instead of getting an average of 4-2K programs and 3-16K programs with the 16K BULLETIN Board, you would receive an average of 6-16K programs with the 16K BULLETIN Board.

Last year we phased out the 1K programs and replaced them with 2K programs. Before this, we asked our subscribers if they had any objections. The only negative responses we felt would be from persons who had a 1K ZX-81 and did not anticipate purchasing a 16K RAMPack.

Not one person responded this way. However, many wrote to tell us they were for the idea. We felt the subscriber has benefitted with programs of better quality on the average since more could be done in 2K than 1.

Now we are wondering if anyone out there has a 2K machine that they do not intend

to upgrade to 16K1

Besides this possibility, the only other drawback might be the short routines that are 2K in size which many people find useful. These routines, of course, can still be loaded into a 16K machine but the subscriber may feel cheated if we counted them as one of the programs because they are not getting the same amount of programs as before.

If this happens, we intend to include enough of these shorter programs to compensate.

Let us know your feelings on this subject as soon as possible.

WINKY PRICE DROP

Bill Russell of G. Russell Electronics has announced a price reduction for the Winky 2. The new prices will be 14.95 for the kit and 19.95 assembled. Include 1.00 for shipping.

For those of you who are not familiar with what the Winky can do, you can make duplicates of a cassette tape from one recorder to another with this device in between the two recorders, no matter how many programs are on the tape.

There is another important use. Do you have a noisy RAMPack that introduces noise onto a tape when you are trying to save a program? When you don't use the RAMPack, the noise disappears, so you know it is the RAMPack.

We have one such RAMPack that is so bad, saved programs cannot be reloaded no matter what the volume adjustment is at. When listening to the tape with the cords disconnected from the recorder, it sounds like the sound a train makes but played

back at a high speed with the program pulses being all but drowned out.

When the Winky 2 board was installed (just plugs in between the computer and the recorder) the program loaded with no problem. Listening to the tape through earphones showed all the noise to have disappeared.

The Winky 2 has the potential to hook up from computer to recorder, recorder to computer, recorder to recorder, computer to computer, computer to recorder and computer, etc. See the ad in this issue for further information or the review in the February 1983 issue.

THE TS-2000 AS A BUSINESS MACHINE

Which computer represents the best buy for business purposes? If mass data entry is required, such as an inventory program for an Auto Parts Store or other such business situations is a prerequisite, the Commodore 64 has the capability to address 64K of RAM. The Radio Shack has 128K capability. The IBM PC and other computers can hold as much as 256K.

Why is RAM memory important? Let us say you had a customer invoice program and you had to enter a few hundred or thousands of customer sets of information per month or year. Almost any computer can do this if you don't mind making a new file everytime your program file runs out of memory.

But what if you wanted all of those customers or inventory items in the same file and held in memory at the same time such as in a situation where a data-sort would be performed? Even 256K could be bulked out with a small Auto-Parts Store.

Of course, the user could purchase a RANDOM ACCESS DATA SORT PROGRAM that sorts data on disk rather than in memory.

Now the user has to consider the price of not only the computer but the disk drives, the disk drive controller, the disk drive interface and the necessary program itself. It doesn't take long to surpass \$5000 or more to reach the end result.

The TS-2000 can address up to 256 64K blocks. This comes out to be 16 megabytes (over 16 million bytes). Compare this with the 2K and 16K Timex machines that many people are already using in business today.

At this time, we are not knowledgeable as to how much of this power will be able to be directly available to the user with add-on peripherals. Memotech has stackable RAMPacks that allow existing ZX/TS machines to hold a megabyte of data in RAM.

It is not too difficult to envision a small business person sitting before the 2000 and having it print out a mailing list of 20,000 customers, all sorted by zip code.

The "People's Computer"! Here it comes!

MATH PROGRAMS FOR SCHOOL

Computech is offering THE MATH TEACHER, an educational software program for levels between first grade elementary to junior high.

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presenting to the student 25 working math problems per session.

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MATH TEACHER is available for the TS/ZX machines for 29.95. It is also available for the IBM-PC, VIC-20/COM-64, OSBORNE-1 and the NEC PC8001A.

THE SPELLING TEACHER will soon be available, also.

For further information, contact:

Computech, Dept. TS-MT-SS
P.O. BOX 7000
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MACHINE CODE STARTER

We have experienced excellent response to last month's machine

Letters To The Editor



Dear Ed,

I think your "BABY-SYNTAX" program is delightful and I would have ordered "SYNTAX" except that my Memotech keyboard doesn't seem to work well with the program.

The keys do not appear to contact each time you press them. For example, you have to press the "A" key 3 or 4 times before it appears on the screen. Keywords work better. Can you suggest a solution?

V. Dela Garza - Ft. Washington,
MD

Dear Vince,

That doesn't sound right at all. Possibly the keyboard contacts are not making proper contact. I will be talking to Memotech in the near future and I'll relay your message and name and address to them.

They do offer their own word-processor in cartridge form for \$49.95. It is not only much faster than "SYNTAX" but has more features, more text memory and comes up running when you turn on the computer. Possibly it would be more suited to their keyboard, which I heard is a beautiful device - Ed.

Dear Ed,

There is a risk in using an address like 30000 for the start

of an M/C routine (Computer Tutor 5/83 -Ed.) without protecting it with a lowered RAMtop. This omission is probably why the program didn't run for you on the ZX-81.

You were lucky it did on the 1000. I used the first line after REM and the program worked OK on both of my computers. I did not try using 30000 and a lowered RAMtop, but I have a feeling that this would work OK too.

Very truly yours,
Warren Fricke - Depew, NY

Dear Warren,

Good to hear from you again (Warren is one of our regular contributors - see "NEEDLE" in the March/83 issue).

I agree that not setting RAMtop can be dangerous but the only time I've encountered problems is when the procedure of setting the RAMtop, entering the M/C routine, typing in "NEW" and then writing in the program and executing it, is used.

This procedure is cumbersome and very confusing - plus it is next to impossible to save many of these operations, in their entirety, on tape.

Take a gander at the "GRAN MARQUEE" program on this month's cassette. I think the professor came up with a real beauty this time. No setting RAMtop, yet it has worked on every computer I

have tried it on, except with the old BB RAMPack (see next letter).

If the program itself allows RAM space for a properly written routine to fit in and the program can POKE it into that space, I can see no reason for setting RAMtop.

I'm probably wrong and I would like to hear your views or anyone elses on the subject.

.....

Dear Ed,

I very much enjoy your magazine - especially the tutorials.

My adventurous nature led me to try the reverse scroll routine in the MAY/83 issue, even though you couldn't get it to work on a ZX-81. I found it worked perfectly.

I did make one change, however, and maybe it was the difference. I took the hex code of the scroll routine and converted it to decimal myself. I then poked the code into a REM statement, my preferred location for M/C routines (first line - 16514 - Ed.).

The address 16514 was substituted for "x" in line 240 and the 9000 section left off. Perhaps other readers can try this solution.

Please continue to include machine code articles in your magazine. They are welcomed by myself and I hope many others.

Thanks,
G. Maake - Whittier, CA

P.S. Naturally, this letter was typed with "BABY SYNTAX".

Dear G.M.,

Good ol' "BABY SYNTAX". Since making that statement about the ZX-81 possibly being responsible for the M/C crash, the Old Professor discovered it wasn't the computer at all. The 16K RAMPack was one of the earlier models from Byte-Back and he believes that some of the RAM addresses in the pack are not addressable, therefore causing the M/C routine to be inoperative. When a different RAMPack was attached to the computer, the routine worked fine.

I'm glad you liked the tutorial and I hope you like the Professor's offering this month - Ed.

.....

Dear Ed,

I began to receive your magazine in February 1983 and I have been very pleased with it. I have read it from cover to cover at least 5 times. I really do enjoy it.

I would like to buy a TS-2000 when it comes out and sell my TS-1000. The problem is that I have a small fortune tied up in software and was wondering if any (a lot is in machine code) would be compatible with the 2000.

Sincerely,
Charlie Day - Gastonia NC

Dear Charlie,

I'm not sure. When the SPECTRUM (European version of the 2000 made by Sinclair) was first introduced, I was assured that the lower 8K of the ROM was identical to the ZX/TS ROM. Supposedly, the user could enter any program written for the ZX/TS into the 2000 and it would run OK.

The 2000, of course, has many

Good ol' "BABY SYNTAX".

more commands that can be added to the program to enhance its effectiveness. A program on tape for the ZX/TS could not be loaded into the 2000 because it operates at a baud rate 5 times as fast. Theorists speculated that if you could speed up the recorder to where the motor speed was 5 times as fast, the program would load OK. Other theories held that possibly some of the "quick-save" routines which save and load programs on the ZX/TS 5 or 6 times as fast could be used. I have not had any input as of yet from any SPECTRUM owners as to whether this could be done.

Machine code is a different story, however. Routines that would normally reside in RAM area may now find this space dedicated to the new ROM. I'm not saying it isn't possible. The routine we had in the May/83 tutorial can be put in a RAM location designated by the BASIC program format.

Selling you 1000 may also be a problem, particularly if you paid over 50 bucks for it and expect to get that money back. Another possible use would be to get the TREE FORTH circuit board for it and have yourself an entirely different computer that would give you computing power with a different scale.

It is not a language as easy to learn as BASIC but you'll be entering a whole new world of real-world computing. See this month's article, "The Forth Corner".

Since you like machine language, you sound like a gent who could really get his teeth into FORTH - Ed.

.....

Dear Ed,

Your program for Mr. Baney that totals and averages input

more commands that can be added

(April, 83, p. 26) is OK except it keeps the total a secret! Rewriting line #80 should help:

```
80 PRINT B;TAB 4;A(B);TAB
13.C
;TAB 23;C/B
```

Amazing how useful such a simple program can be for something like accounting - to be used, only after all the game-playing is complete, of course.

Sincerely,
Dr. Frederick Zlotkin - NY, NY

I concur - Ed.

=====

(Programs cont.)

To enter your own messages into this program, BREAK it and enter the lines:

```
11 INPUT A$
12 INPUT B$
36 LET A$=Q$ + A$ + Q$
37 LET B$=Q$ + B$ + Q$
```

The first message entered will appear in the top rectangular box and the second message in the bottom rectangular box. The messages look better if entered in the graphics mode.

=====

(Editor Ramblings cont.)

language tutorial. Bob Lucas of BARLOG SOFTWARE sent us a few programs he wrote. He is offering a program tape for beginners interested in machine code.

It's called the MACHINE CODE STARTER and comes with three subroutines and documentation explanation formatted in language for the beginner. It sells for 6.95 and requires 16K.

For more info about this and other products, contact Bob at the Barlog address listed above.

=====

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